DEPA

Federal Highway Administration

23 CFR Part 655

[FHWA Docket No. FHWA-2009-0139]

RIN 2125-AF34

National Standards for Traffic Control Devices; the *Manual on Uniform Traffic Control Devices for Streets and Highways*; Maintaining Pavement Marking Retroreflectivity

AGENCY: Federal Highway Administration (FHWA), U.S. Department of Transportation (DOT).

ACTION: Final rule.

SUMMARY: The purpose of this final rule is to update the *Manual on Uniform Traffic Control Devices* (MUTCD) to provide standards, guidance, options, and supporting information relating to maintaining minimum levels of retroreflectivity for pavement markings. The MUTCD is incorporated in FHWA regulations and recognized as the national standard for traffic control devices used on all streets, highways, bikeways, and private roads open to public travel.

DATES: Effective on [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]. The incorporation by reference of certain publications listed in the rule is approved by the Director of the *Federal Register* as of [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

FOR FURTHER INFORMATION CONTACT: Ms. Cathy Satterfield, Office of Safety, (202) 309-0465, cathy.satterfield@dot.gov; or Mr. William Winne, Office of the Chief Counsel, (202) 366-1397, william.winne@dot.gov, Federal Highway Administration, 1200 New Jersey Avenue, S.E., Washington, D.C. 20590-0001.

SUPPLEMENTARY INFORMATION:

Executive Summary

I. Purpose of the Regulatory Action

Section 406 of the Department of Transportation and Related Agencies Appropriations Act, 1993 (Pub. L. 102-388; October 6, 1992) directed the Secretary of Transportation to "revise the Manual on Uniform Traffic Control Devices to include – a standard for a minimum level of retroreflectivity that must be maintained for pavement markings and signs, which shall apply to all roads open to public travel." Reducing transportation-related fatalities and serious injuries is a primary goal of FHWA.[1] The purpose of including a minimum retroreflectivity standard in the MUTCD[2] is to advance safety and mobility by assisting with the nighttime visibility needs of drivers. This final rule addresses driver visibility needs in terms of pavement markings. The final rule for maintaining minimum levels of retroreflectivity for traffic signs was issued on December 21, 2007, at 72 FR 72574. Both rules are based on older driver needs with an average age of 62 years. While the minimum retroreflectivity levels in the rule are based on driver needs, the improvement in markings that will result from this rule will also improve the infrastructure's ability to work with advanced driver assistance systems (ADAS) and automated driving systems (ADS).

II. Summary of the Major Provisions of the Regulatory Action in Question

This final rule establishes minimum maintained retroreflectivity levels for longitudinal pavement markings on all roads open to public travel with speed limits of 35 mph or greater. The final rule requires applicable agencies or officials to implement a method for maintaining pavement marking retroreflectivity at or above minimum levels, providing a 4-year compliance date for implementing the method. It provides options for

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[1] FHWA's Commitment to Safety can be viewed at the following website: https://safety.fhwa.dot.gov/zerodeaths.

[2] The current edition of the *Manual on Uniform Traffic Control Devices* can be viewed at the following Website: http://mutcd.fhwa.dot.gov/kno_2009r1r2.htm.

agencies on roads where illumination or low volumes make the markings less critical and for certain types of markings. It also acknowledges short-term allowances of subminimum retroreflectivity based on special circumstances. As with the current MUTCD requirements for sign retroreflectivity, this final rule does not include compliance dates for replacement of pavement markings that do not meet minimum retroreflectivity levels. Pavement marking replacement schedules will be based on the methods established by agencies or officials.

III. Costs and Benefits

FHWA has estimated the costs and potential benefits of this rulemaking and has determined that this final rule fulfills the requirements under Section 406 of the Department of Transportation and Related Agencies Appropriations Act, 1993 (Pub. L. 102-388; October 6, 1992), while also providing flexibility for agencies. The estimated national costs and benefits are documented in the updated economic analysis report titled *Economic Impacts of Minimum Maintained Levels of Pavement Marking Retroreflectivity in the MUTCD*, and the flexibility for each agency to choose a method that works best for them to implement the new standard is documented in the new publication titled *Methods for Maintaining Pavement Marking Retroreflectivity*.[3]

The MUTCD already requires that pavement "markings that must be visible at night shall be retroreflective unless ambient illumination assures that the markings are adequately visible," and that "all markings on interstate highways shall be retroreflective."[4] However, the MUTCD does not currently require that pavement markings meet a minimum level of retroreflectivity. The changes in the MUTCD will provide drivers the benefit of pavement markings that are maintained at or above

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[3] The reports titled *Economic Impacts of Minimum Maintained Levels of Pavement Marking Retroreflectivity in the MUTCD* and *Methods for Maintaining Pavement Marking Retroreflectivity* can be viewed on the docket using FHWA Docket No. FHWA-2009-0139.

[4] Section 3A.02 of the 2009 Manual on Uniform Traffic Control Devices can be viewed at the following Website: http://mutcd.fhwa.dot.gov/kno_2009r1r2.htm.

retroreflectivity levels supported by research on driver needs. In addition, the improved maintenance of pavement markings as a result of this final rule is expected to benefit all road users and ADAS and ADS technology.

The economic analysis provides a national estimate of the costs of implementing this rulemaking and a break-even analysis for maintaining marking retroreflectivity at the established levels. Costs for individual agencies were not computed because they will vary based on factors such as the amount of pavement marking mileage subject to the standards and current pavement marking practices. The analysis estimates one-time national costs in the first year of $16.17 million for all affected State and local agencies to establish maintenance methods, purchase necessary equipment, and implement their method the first time. In subsequent years, these agencies are expected to incur increased costs nationwide totaling $29.07 million annually as a result of this rule. These annual costs include $3.44 million in activities to assess or manage markings as a result of this rulemaking, including replacement of equipment. Although this final rule has no compliance dates for replacing markings, the annual costs also include pavement marking replacement expenditures of approximately $25.63 million per year beyond current expenditures.

A thorough review of research indicates crashes are typically reduced by the presence of longitudinal pavement markings, and this rulemaking is expected to improve the nighttime presence of these markings, particularly where they are not currently well maintained. Therefore, FHWA believes the improved maintenance of pavement marking retroreflectivity as a result of this rule will provide some reduction in severe crashes. However, since the current levels of pavement marking retroreflectivity are not well known, particularly at the time and location where crashes occur, it is not possible to quantify the benefit specifically attributable to this final rule. As documented in the economic analysis, the most likely effect would be to reduce some of the crashes

occurring in dark, unlighted conditions, which result in approximately 10,000 lives lost annually. The break-even analysis indicates that the rule will achieve benefits equal to costs if it saves three lives annually.[5]

Background and Legal Authority

Section 406 of the Department of Transportation and Related Agencies Appropriations Act, 1993 (Pub. L. 102-388; October 6, 1992) directed the Secretary of Transportation to "revise the *Manual on Uniform Traffic Control Devices* to include – a standard for a minimum level of retroreflectivity that must be maintained for pavement markings and signs, which shall apply to all roads open to public travel." The final rule for maintaining minimum levels of retroreflectivity for traffic signs was issued on December 21, 2007, at 72 FR 72574. The 2009 MUTCD with Revision Numbers 1 and 2 incorporated is the most current edition of the MUTCD. It requires agencies to implement and have continued use of an assessment or management method that is designed to maintain regulatory and warning sign retroreflectivity at or above the established minimum levels.

Under the authority delegated to FHWA in 49 CFR 1.85 and Section 406 of the Department of Transportation and Related Agencies Appropriations Act of 1993, FHWA used research, stakeholder input, and knowledge it gained through the sign retroreflectivity rulemaking process to prepare the Notice of Proposed Amendment (NPA) for maintaining pavement marking retroreflectivity, which was published on April 22, 2010, at 75 FR 20935. The NPA proposed to amend the MUTCD to include standards, guidance, options, and supporting information related to maintaining minimum levels of retroreflectivity for pavement markings. FHWA received approximately 100 responses that were submitted to the docket containing nearly 700 individual comments.

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[5] The report titled *Economic Impacts of Minimum Maintained Levels of Pavement Marking Retroreflectivity in the MUTCD* can be viewed on the docket.

State and local departments of transportation, as well as associations that represent them, submitted many comments expressing concern over key elements of the MUTCD text as proposed in the NPA. The commenters expressed confusion about which pavement markings would be required to meet minimum retroreflectivity values and concern over compliance dates for replacing deficient markings, the proposed numerical minimum retroreflectivity levels, cost, and liability. Organizations comprised of safety advocates and industry suppliers of pavement markings submitted comments suggesting that the NPA did not go far enough in establishing retroreflectivity standards.

In its comments to the NPA, the American Association of State Highway and Transportation Officials (AASHTO) and the National Association of County Engineers (NACE) requested delaying the final rule for pavement marking retroreflectivity until AASHTO's Subcommittee on Traffic Engineering (SCOTE) completed a research project intended to provide a synthesis of pavement marking retroreflectivity maintenance practices. The organizations and many of their members felt this project would produce actual measurement of in-service pavement marking retroreflectivity levels to compare with the minimum values proposed by FHWA. The project was completed under National Cooperative Highway Research Program (NCHRP) Project 20-07 Task 310. The findings were published January 2013 in a report titled *Determination of Current Levels of Retroreflectance Attained and Maintained by State Departments of Transportation*.[6]

In consideration of all the comments and based on additional research findings from NCHRP Project 20-07 Task 310, FHWA published a Supplemental Notice of Proposed Amendment (SNPA) January 4, 2017, at 82 FR 770. Additional information on

[6] The report titled *Determination of Current Levels of Retroreflectance Attained and Maintained by State Departments of Transportation* can be viewed at the following Website: http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=3074.

pavement marking retroreflectivity, drivers' needs, and associated research, is contained in the SNPA preamble.

Since the publication of the SNPA, Section 11135 of the Bipartisan Infrastructure Law, enacted as the Infrastructure Investment and Jobs Act, Pub. L. 117-58 (Nov. 15, 2021), specifically required the update of minimum retroreflectivity of pavement markings in the MUTCD.

Based on the comments received on the NPA and the SNPA, FHWA is issuing this final rule establishing minimum levels of retroreflectivity that must be maintained for longitudinal pavement markings. FHWA is designating the MUTCD, with these changes incorporated, as Revision No. 3 of the 2009 edition of the MUTCD. The text of this Revision No. 3 and the text of the 2009 edition of the MUTCD with Revision No. 3 final text incorporated are available on the docket. Furthermore, Revision No. 3 changes are available on the official MUTCD Website at https://mutcd.fhwa.dot.gov. The entire MUTCD text with Revision No. 3 text incorporated is also available on the MUTCD website.

Summary of Comments

FHWA received 47 letters submitted to the docket with approximately 130 individual comments in response to the SNPA. FHWA received comments from the National Committee on Uniform Traffic Control Devices (NCUTCD), SCOTE, 13 State departments of transportation (State DOT), the American Traffic Safety Services Association (ATSSA), city and county governmental agencies, consulting firms, private industry, associations, other organizations, and individual private citizens. FHWA has considered all of these comments in the development of the final rule. Docket comments and summaries of FHWA's analyses and determinations are discussed as follows.

Discussion of General Comments

Many respondents supported FHWA's efforts to simplify and clarify the MUTCD text from what was proposed in the NPA and indicated that their concerns were addressed with the MUTCD text proposed in the SNPA. Some other commenters, particularly those affiliated with safety associations and manufacturers, indicated that the standard did not go far enough toward meeting the congressional intent of the statutory provision.

The Delaware and Ohio Departments of Transportation (ODOT) supported the SNPA with no other comments, and the Indiana, Kansas, Oregon, and Wyoming Departments of Transportation supported the SNPA with minor comments. The Michigan, Minnesota, South Dakota, and Virginia Departments of Transportation generally supported AASHTO's comments, in some cases with modifications; whereas Arizona Department of Transportation supported the comments submitted by both AASHTO and NCUTCD.

In analyzing the comments to the SNPA, FHWA decided that additional clarification should be provided in the MUTCD text or in the final rule preamble to address the comments regarding the following four major categories:

(1) Compliance Date for Implementation of a Method.

(2) Methods and Documentation.

(3) Retroreflectivity Levels and Optional Exclusions.

(4) Special Circumstances and Compliance.

Discussion of Major Comment Categories

This section provides a discussion of each of the four major categories raised by commenters in response to the SNPA, along with FHWA's analysis and resolution.

(1) Compliance Date for Implementation of a Method

AASHTO and several State DOTs requested that the compliance date be changed from 4 to 5 years. The Michigan Department of Transportation (MDOT) indicated that the change to 5 years would allow more time to achieve compliance because

implementation of minimum pavement marking retroreflectivity is a maintenance function. MDOT indicated that it takes additional time to establish a feasible methodology and agency practices, estimate costs, and program and receive funding. The Alaska Department of Transportation and Public Facilities (DOT&PF) provided similar justification for suggesting the compliance date be extended to 6 years. NCUTCD also suggested a 6-year compliance date but did not provide any information to support the timeframe extension. The Virginia DOT suggested a 5-year compliance date. None of the local agencies provided specific comments on the compliance date. However, Woodbury County, Iowa, expressed support for NCUTCD's letter, which suggested a 6-year compliance date. ATSSA suggested adding a compliance requirement that markings covered in this section of the MUTCD meet the minimum retroreflectivity levels 6 years from the effective date of this final rule.

Upon review and consideration of the comments, FHWA believes that 4 years is appropriate for compliance because the compliance date relates only to establishing and implementing a method, not replacing deficient markings. Pavement marking replacement schedules will be based on the methods established by agencies or officials. To maintain consistency with Revision No. 2 of the 2009 MUTCD, which removed the compliance dates for replacement of signs that are identified as failing to meet the minimum retroreflectivity requirements, FHWA does not add an additional compliance date requirement for replacement of deficient markings. As a result, FHWA retains compliance date language as proposed in the SNPA. The compliance provision is only for implementation and continued use of a method that is designed to maintain retroreflectivity of longitudinal pavement markings, and the compliance date is 4 years from the effective date of this final rule.

(2) Methods and Documentation

In the SNPA, FHWA proposed that methods used to maintain retroreflectivity should be one or more of those described in a separate document titled *Methods for Maintaining Pavement Marking Retroreflectivity*, or developed from an engineering study based on the minimum retroreflectivity values in paragraphs 1 and 2 of Section 3A.03. This differed from the NPA, where FHWA proposed to include the names along with short descriptions of the recommended methods within the MUTCD text. The Wyoming Department of Transportation (WYDOT) indicated that placing the methods in a separate reference document, rather than the MUTCD, places a burden on agencies to navigate to another document and expressed concern that an online document could be dynamic; therefore, agencies may not be aware of future changes. WYDOT also indicated that the MUTCD has historically been a standalone document, so adding other documents to supplement it complicates, rather than simplifies, the MUTCD.

As stated in the SNPA, FHWA believes more details are needed to describe fully the intent of the methods and to avoid misinterpretation. To simplify the MUTCD, FHWA believes it is more appropriate to refer MUTCD users to this supplemental document rather than trying to summarize its contents in the MUTCD. An added benefit to this approach is that this document, which will be available on FHWA's Website, will include detailed guidance on how to use the methods and will inform agencies that other methods may be developed provided they are tied to the minimum retroreflectivity levels through an engineering study. This document also includes information about techniques that are not recommended for maintaining minimum pavement marking retroreflectivity (because they cannot be tied to the minimum retroreflectivity levels) and recommendations concerning items to consider and/or include in documentation of method(s). FHWA believes that by providing all the pertinent guidance related to the methods to maintain pavement marking retroreflectivity in one place, users are more likely to obtain complete information and, therefore, make more informed decisions

about the method(s) they use for maintaining minimum pavement marking retroreflectivity.

Several commenters provided comments about the specific methods used to maintain minimum retroreflectivity that are documented in the reference, *Methods for Maintaining Pavement Marking Retroreflectivity*. ATSSA recommended replacing the reference report with a requirement that pavement marking retroreflectivity be measured using a retroreflectometer. ATTSA suggested that advances in retroreflectometers over the past 10 years render measurement of retroreflectivity the most appropriate and, as a result, favored allowing only the use of methods that involve measuring retroreflectivity with a retroreflectometer. A vendor offered a similar viewpoint, suggesting that an objective measurement method, such as mobile retroreflectometers, be required instead of subjective evaluation methods. The vendor indicated that methods, such as the calibrated pavement markings procedure, may introduce data inconsistency and variability; whereas, mobile systems provide a safe, practical, and traceable data collection method without compromising objectivity or accuracy. WYDOT offered an opposing comment, commending FHWA for allowing blanket replacement as a management strategy, mirroring that of the sign retroreflectivity methods.

FHWA believes that using retroreflectivity measurements as the sole basis for maintaining minimum retroreflectivity would eliminate benefits that agencies may find with nighttime visual inspections and would be costly and burdensome to some agencies. Small agencies in particular could face significant financial difficulties in acquiring measurement equipment and may find it burdensome to develop an appropriate evaluation plan, measure longitudinal markings regularly, and manage the measurement data. In addition, several comments to the NPA supported flexibility in the methods. *Methods for Maintaining Pavement Marking Retroreflectivity* documents advantages and concerns for each method to assist agencies in choosing the most appropriate method for

their situation.[7] Therefore, FHWA believes that flexibility in maintenance methods is appropriate. Documentation of methods, processes, and policies are important components for agencies to consider.

(3) Retroreflectivity Levels and Optional Exclusions

FHWA received numerous comments to the NPA indicating confusion with the proposed table that indicated which markings were included in the minimum retroreflectivity requirements and the minimum retroreflectivity values applied under specific roadway types and marking patterns. To reduce confusion and simplify application of the standard, FHWA simplified the minimum pavement marking retroreflectivity values in the SNPA to two values, removed references to warrants in other sections of the MUTCD, removed criteria based on roadway configuration and marking patterns, and removed the table. The resulting language consisted of one required and one recommended retroreflectivity value according to the statutory or posted speed limit of the roadway. As indicated previously, several commenters fully supported the SNPA and felt that the proposed SNPA MUTCD text reflected changes that addressed many of the comments on the NPA. Several commenters still provided remarks about details related to the proposed minimum maintained retroreflectivity levels, including comments about the speed limit thresholds, the required numerical retroreflectivity levels, markings that may be excluded, and special circumstances.

The Standard statement in the SNPA required that a method designed to maintain retroreflectivity levels at or above 50 mcd/m^2/lx shall be used for longitudinal markings on roadways with statutory or posted speed limits of 35 mph or greater, except as allowed by option for specific roadways or markings.[8] As indicated in the SNPA, the 35-mph

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[7] The report titled *Methods for Maintaining Pavement Marking Retroreflectivity* can be viewed on the docket.

[8] The units of pavement marking retroreflectivity are reported in mcd/m^2/lx, which means millicandelas per square meter per lux.

threshold below which a method would not be required was a key concept that was carried forward from the NPA. FHWA received comments from NACE and 26 local agencies supporting the NPA proposal that the minimum levels not apply to roads with posted speeds of less than 35 mph; therefore, FHWA retained that concept in the SNPA. ATSSA, the American Highway Users Alliance (AHUA), and several vendors indicated that the intent of the language in the Appropriations Act, as well as drivers' needs, require that minimum retroreflectivity levels be maintained for pavement markings on all roadways regardless of posted speed. Therefore, the commenters suggested that the MUTCD text include minimum maintained retroreflectivity levels for roadways with posted speeds less than 35 mph. These associations and vendors provided similar comments to the NPA. One local agency suggested that severe crashes occur on roads with posted speeds of 35 mph and lower and suggested that the MUTCD text be based on data and risk mitigation.

FHWA agrees that agencies should apply safety treatments systemically based on risk factors. A query of the National Highway Traffic Safety Administration's (NHTSA's) Fatality Analysis Reporting System (FARS) for the most recent 3 years of available data indicates that only 10 percent of vehicles involved in fatal crashes during dark conditions were traveling on roads with speed limits under 35 mph. While this 10 percent is not insignificant, FHWA believes that many of these fatal crashes would not be mitigated by improved retroreflectivity of longitudinal pavement markings since properly working vehicle headlights generally provide sufficient illumination for the needed preview distance of the road itself at these lower speeds. As a result, FHWA believes little benefit is derived from requiring agencies to implement a method to maintain a specific minimum retroreflectivity level of markings on roadways with speed limits below 35 mph and retains this threshold in the final rule. FHWA simplifies the MUTCD text in this final rule by removing "statutory and posted" as modifiers to "speed limits"

since there is no other type of speed limit. This also provides consistency within the MUTCD.

The SNPA Guidance statement proposed that a method designed to maintain retroreflectivity at or above 100 mcd/m^2/lx should be used for longitudinal markings on roadways with statutory or posted speed limits of 70 mph or greater. As indicated in the SNPA, the minimum maintained retroreflectivity levels were based on research and comments to the NPA. The NPA-proposed minimum retroreflectivity value of 250 mcd/m^2/lx for two-lane roads with only center line markings and speeds of 55 mph or greater was particularly controversial. FHWA received comments from AASHTO, NCUTCD, NACE, and several State DOTs suggesting that it was not feasible with existing technologies to maintain a retroreflectivity level of 250 mcd/m^2/lx. AASHTO and 9 State DOTs suggested reducing this value to 100 mcd/m^2/lx, whereas NCUTCD and NACE suggested a value of 150 mcd/m^2 lx. FHWA proposed a minimum level of 100 mcd/m^2/lx in the SNPA based on research of pavement marking retroreflectivity requirements documented in publication FHWA-HRT-07-059, *Updates to Research on Recommended Minimum Levels for Pavement Marking Retroreflectivity to Meet Driver Night Visibility Needs*.[9]

ATSSA provided comments on the SNPA suggesting that the minimum of 100 mcd/m^2/lx for speeds of 70 mph and higher falls short of the intent of the Appropriations Act and will contribute to unsafe driving conditions. ATSSA suggested that the proposed guidance will not result in a change in maintenance of pavement marking retroreflectivity such that the public will benefit from improved pavement marking retroreflectivity. As a result, ATSSA suggested deleting the Guidance statement and revising the Standard to state that "175 mcd/m^2/lx shall be used for posted speed

[9] The report titled *Updates to Research on Recommended Minimum Levels for Pavement Marking Retroreflectivity to Meet Driver Night Visibility Needs* can be viewed at the following Internet Web site: http://www.fhwa.dot.gov/publications/research/safety/07059/.

limits greater than 35 mph." A consortium of vendors also supported a minimum maintained retroreflectivity level of 175 mcd/m^2/lx but for roadways with statutory or posted speeds of 45 mph or greater. NCUTCD also suggested deleting the Guidance statement and including the requirement for minimum maintained retroreflectivity of 100 mcd/m^2/lx for roadways with statutory or posted speeds greater than 70 mph in the Standard statement.

FHWA believes that the minimum recommended level of 100 mcd/m^2/lx for speed limits of 70 mph will improve overall retroreflectivity of markings without placing an undue burden on agencies. It is the intent of this Guidance statement to encourage agencies to improve pavement marking retroreflectivity, and not to require public agencies to meet levels that would be impractical to maintain with existing technologies or that would discourage the use of pavement markings where they are not required. As always, agencies may choose to maintain their pavement markings to standards higher than required or recommended by the MUTCD. In consideration of these factors, FHWA retains the Guidance statement recommending a value of 100 mcd/m^2/lx or above be maintained for longitudinal markings on all roadways with speed limits of 70 mph or greater. While these are only recommended levels, these roadways would be subject to the requirements found in the Standard applicable to roadways with speed limits of 35 mph or greater. As with the Standard statement, FHWA simplifies the Guidance statement in this final rule by removing "statutory and posted" as modifiers to "speed limits" since there is no other type of speed limit.

Separate from the comments related to specific retroreflectivity values, one commenter submitted a draft paper[10] quoting research that suggested the research upon

[10] The article, "On the relationship between road safety research and the practice of road design and operation" was published in Accident Analysis and Prevention, Volume 128, July 2019, pp 114-131 and can be accessed at the following Internet Website: https://www.sciencedirect.com/science/article/abs/pii/S0001457518311710?via%3Dihub

which this rulemaking is based fails to show that there are safety benefits associated with maintaining minimum levels of pavement marking retroreflectivity. As part of its analysis of the docket comments, FHWA reviewed the Appropriations Act that required this rulemaking and performed a rigorous review of available research regarding pavement markings, retroreflectivity, and nighttime crashes. The requirement for rulemaking was in the Appropriations Act, and while the Appropriations Act language does not specifically state that the purpose was to improve safety, statements made by Senator Durenberger and testimony leading up to its passage suggest that there were assumptions that maintaining minimum pavement marking retroreflectivity would improve safety.[11] Most commenters throughout this rulemaking process have indicated that they believe that higher retroreflectivity values would improve safety. Based on the review of nighttime crash rates, and all available research, FHWA continues to pursue this rulemaking because evidence indicates that retroreflective pavement markings are important to safety.

FHWA performed a rigorous review of available research reports related to the safety effect of the presence of markings, safety effect of pavement marking retroreflectivity, and drivers' nighttime needs for pavement marking retroreflectivity. Studies indicate the presence of markings improves safety of two-lane rural roads.[12,13] The results of the research specifically related to the effect of pavement marking retroreflectivity on crashes were mixed and seem to indicate that no study has yet been performed that included a significant portion of markings at very low retroreflectivity

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[11] Surface Transportation Efficiency Act (Senate June 19, 1991),137 Cong. Rec. 58099 (1991) p. S8100.
[12] Sun, X., and S. Das. *A Comprehensive Study on Pavement Edge Line Implementation.* FHWA/LA.13/508, April 2014 can be viewed at the following Web link: https://www.ltrc.lsu.edu/pdf/2014/FR_508.pdf
[13] Tsyganov, A., R. Machemehl, and N. Warrenchuk. *Safety Impact of Edge Lines on Rural Two-Lane Highways in Texas.* FHWA/TX-05/0-5009-1, September 2005 can be viewed at the following Web link: https://ctr.utexas.edu/wp-content/uploads/pubs/0_5090_1.pdf

values that may indicate an appropriate minimum value.[14] Therefore, this rulemaking continues to be based on research of minimum driver needs, which FHWA believes will provide a nighttime presence of markings that is likely to reduce crashes. A review of available information related to driver nighttime visibility needs found no modeling improvements or more recent information that would meaningfully impact the findings of the research that was the basis for the NPA and SNPA.[15]

In the SNPA, FHWA included an Option statement that allows several types of markings to be excluded from the minimum maintained retroreflectivity provisions. Although not required to meet the minimum retroreflectivity values, these markings are still required to be retroreflective, unless otherwise excluded in the MUTCD. FHWA included these optional exclusions, not because these markings are of less value than the longitudinal lines but because in many cases the markings are not required or additional research would be required to support establishing minimum retroreflectivity levels for these markings. Item A excludes "markings where ambient illumination assures that the markings are adequately visible."[16] ODOT stated support for this item. NCUTCD and the DOT&PF suggested that the text be revised to read, "Markings where ambient illumination is provided," because the term "adequately visible" is undefined and ambiguous. While FHWA agrees that there is not a definition for the term "adequately visible," FHWA retains the language in the final rule to maintain consistency with the existing text in Section 3A.02, paragraph 2, which states, "Markings that must be visible

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[14] Carlson, P.J., E.S. Park, and D.H. Kang. An Investigation of Longitudinal Pavement Marking Retroreflectivity and Safety. *Transportation Research Record: Journal of the Transportation Research Board*, 2337 (2013). The FHWA Final Report can be viewed at the following Web link: https://static.tti.tamu.edu/tti.tamu.edu/documents/TTI-2014-16.pdf

[15] Federal Highway Administration, *Updates to Research on Recommended Minimum Levels for Pavement Marking Retroreflectivity to Meet Driver Night Visibility Needs*, FHWA-HRT-07-059 (McLean, VA: FHWA, 2007) can be viewed at the following Web link: https://www.fhwa.dot.gov/publications/research/safety/07059/02.cfm

[16] The 2009 Manual on Uniform Traffic Control Devices can be viewed at the following Website: http://mutcd.fhwa.dot.gov/kno_2009r1r2.htm.

at night shall be retroreflective unless ambient illumination assures that the markings are adequately visible."

An option to exclude markings on roadways that have average annual daily traffic (ADT) of less than 6,000 vehicles per day (vpd) was also included in the provisions of the SNPA. This exclusion represented a simplified approach to the NPA-proposed MUTCD text, which was based on the MUTCD warrants for longitudinal pavement markings. The requirements and recommendations in the warrants for center lines, lane lines, and edge lines vary based on different factors, including traffic volume, roadway width, and functional class. Commenters indicated that the NPA-proposed MUTCD text was not clear. The exclusion provided in item B of the SNPA-proposed MUTCD text, based solely on traffic volume, also responded specifically to comments on the NPA that FHWA received from 2 local agencies and 1 road commission representing over 80 local agencies suggesting that low-volume roads be excluded from meeting minimum pavement marking retroreflectivity values.

AASHTO, NCUTCD, and the Minnesota, South Dakota, and Virginia DOTs all supported the exclusion for roadways with ADT volumes less than 6,000 vpd. Several vendors, ATSSA, and AHUA disagreed with this optional exclusion in the SNPA, stating that it is counter to the Appropriations Act, which says the minimum retroreflectivity levels apply to "all roads open to public travel." AHUA also stated that including this exclusion reduces the likelihood that the vast majority of rural two-lane roads will be required to have adequate markings.

As discussed in the SNPA preamble, FHWA conducted a thorough review of MUTCD text when developing the 6,000-vpd threshold. Because a volume of 6,000 vpd is the threshold above which center lines and edge lines are required on most classes of road (see Section 3B.02, paragraph 9, and Section 3B.07, paragraph 1), FHWA believes that it is appropriate to establish 6,000 vpd as the volume above which a method for

maintaining pavement marking retroreflectivity applies. As stated in the SNPA, FHWA received comments to the NPA from NCUTCD, AASHTO, NACE, and over 40 State and local agencies pertaining to whether minimum pavement marking retroreflectivity should include only those pavement markings required in the MUTCD or a combination of required and recommended pavement markings. Some State and local DOTs suggested that if there were a requirement to maintain retroreflectivity on pavement markings that were only recommended (by means of a Guidance statement) and not required, then they might elect not to install such recommended markings. FHWA wants to encourage, not discourage, the use of recommended pavement markings. Therefore, FHWA believes the 6,000-vpd threshold simplifies the MUTCD text and makes it much easier for agencies to determine to which roads the standard applies. The threshold also gives consideration to agencies' resource and liability concerns. Because this is an OPTION statement, agencies can choose to include roadways with less than 6,000 vpd in their methods for maintaining minimum pavement marking retroreflectivity.

As part of the comments related to the exclusion of roadways with less than 6,000 vpd, a few commenters indicated the specific need to include ramps in this optional exclusion. Based on a review of the comments and various terms and definitions relating to ramps and roadways in the MUTCD, FHWA changes the term "roadways" to "streets and highways" to provide consistency with other parts of the MUTCD and to clarify that the intent of this final rule is to consider a highway as one facility, rather than analyzing each direction of divided highways separately. FHWA believes ramps are a component of a highway and intends for the provisions of this exclusion to apply to ramps.

(4) Special Circumstances and Compliance

The NPA included a Support statement indicating that use of the method was the measure of compliance even if markings were below the minimum levels of retroreflectivity in particular locations at particular points in time. The NPA also

indicated agencies should consider the many factors both within and outside an agency's control that might impact marking retroreflectivity as they developed their methods. Based on comments to the NPA, FHWA provided additional information in the SNPA paragraph 7 Support statement to clarify that under such circumstances, an agency would still be considered in compliance with the Standard and Guidance statements regarding maintaining minimum retroreflectivity as long as the agency was taking a reasonable course of action to restore the markings in a timely manner. FHWA also provided a list of such special circumstances to address comments from NCUTCD, AASHTO, and State and local DOTs. The list is not exhaustive; it simply provides examples of planned or unplanned events that could inhibit the reasonable and effective execution of a pavement marking maintenance method to provide for the minimum retroreflectivity levels on every inch of marking at all times. As described in the SNPA, the list includes: (A) isolated locations of abnormal degradation, (B) periods preceding imminent resurfacing or reconstruction, (C) unanticipated events such as equipment breakdowns, materials shortages, contracting problems, and other similar conditions, and (D) loss of retroreflectivity resulting from snow maintenance operations.

NCUTCD, SCOTE, and AASHTO recommended several revisions to paragraph 7 of the SNPA MUTCD text. The organizations suggested that the introductory sentence to the paragraph include "weather and road conditions" in addition to "special circumstances" that would cause pavement marking retroreflectivity to fall below the minimum levels. FHWA contends that weather and road conditions are too broad to be considered special circumstances with regard to marking degradation and replacement decision-making by agencies. In addition, that level of detail is not consistent with the type of language used throughout the MUTCD.

The organizations also suggested that item (B) be revised to specify that "periods during construction" be added to special circumstances and the word "imminent" be

deleted from the phrase regarding "programmed or planned resurfacing or reconstruction." FHWA specifically intends for pavement marking retroreflectivity levels to be maintained during periods leading up to and during construction. FHWA's intent for this item, as stated in the SNPA, is to alleviate the requirement to maintain minimum retroreflectivity levels for the brief period preceding imminent resurfacing or reconstruction if the new markings will be paved over or milled away in a short time frame. FHWA believes that the term "imminent" implies a much shorter timeframe than "planned or programmed" and therefore retains the existing wording for item (B).

AASHTO and NCUTCD suggested that item (C) be revised to state "contracting delays" rather than "contracting problems." AASHTO suggested that the term "delays" more accurately represents what happens and the term "problems" has multiple meanings. While FHWA considered AASHTO's interpretation of the terms, FHWA believes that "problems" would encompass many issues, besides delay, such as default or substandard performance that may jeopardize effective method execution. Therefore, FHWA retains the word "problems" in item (C). Since the example of events in item (C) is not meant to be exhaustive and the introductory sentence already indicates such, the phrase "and other similar conditions" was deleted from the MUTCD text in this final rule.

AASHTO, NCUTCD, the Illinois Department of Transportation, and a consortium of vendors suggested adding an item (E) to the list of special circumstances to include pavement type, pavement condition, temperature, or weather. AASHTO reasoned that this addition reflects that pavement markings that are removed due to winter maintenance, such as snow plow operations, or otherwise fall below minimum retroreflectivity levels cannot be replaced during cold weather due to air or pavement temperatures, and even if they were replaced, they could be removed during a subsequent storm. FHWA understands that these situations do occur. However, it is impractical to

specify every unique situation. The introductory sentence to paragraph 7 indicates that the items listed are not exhaustive, so other situations may arise that result in pavement markings falling below the minimum maintained level.

AASHTO, the Michigan, Minnesota, and Virginia DOTs, and a consortium of vendors suggested deleting the last sentence in the paragraph 7 Support statement regarding compliance under special circumstances and replacing it with a Standard statement to tie compliance to the use of an agency's standard operating procedures. The commenters suggested specific text that would allow an agency to be in compliance with the minimum retroreflectivity levels, even if special circumstances resulted in falling below the minimum levels, if the agency took a reasonable course of action to restore markings in accordance with the agency's policies and procedures and based on FHWA's publication *Methods for Maintaining Pavement Marking Retroreflectivity*. FHWA agrees that the reasonable course of action encompasses not only replacing the markings but resuming the execution of work associated with the agencies' established method(s), including preparatory roadway work or inventory management activities as needed before restoration commenced. However, rather than adding a Standard statement, FHWA revises the last sentence of the Support statement to indicate that compliance is considered achieved if an agency takes a reasonable course of action to resume maintenance of minimum retroreflectivity in a timely manner according to the maintaining agency's method(s), policies, and procedures. FHWA believes that this language is most appropriate in a Support statement, which is consistent with a similar Support statement for signs in Section 2A.08, Maintaining Minimum Retroreflectivity.

Discussion of Other Comments

NCUTCD and the Kansas, Oregon, and South Dakota Departments of Transportation suggested that the MUTCD text be revised to clarify that pavement marking retroreflectivity levels apply to dry conditions. Although the reference to dry

conditions was contained in the SNPA preamble, the agencies felt that the MUTCD text should include that provision. In response to the comments, FHWA revises paragraphs 1 and 2 in the final rule to specify that the retroreflectivity levels apply to dry conditions.

One pavement marking manufacturer suggested that while the SNPA specified dry conditions, wet-weather visibility of pavement markings at night is a problem. This commenter also suggested that with more connected and automated vehicles using the roads, the ability to see markings under wet conditions will become more important. As a result, this commenter suggested that future rulemakings incorporate wet-weather retroreflectivity requirements, similar to the European standard EN1436. FHWA recognizes the importance of nighttime retroreflectivity during wet conditions. Pavement markings that are to be visible at night are required to be retroreflective, but minimum maintained levels of retroreflectivity under wet conditions are not the subject of this rulemaking and could be considered at a later date when applicable research is available.

One local county questioned whether the 30-meter measurement upon which the research was based would be applicable for ADAS or ADS technology. This commenter also suggested that the scope of the section be expanded to include ADAS and ADS technology. One other commenter suggested that a future revision may be needed to address ADAS. FHWA is very supportive of addressing the infrastructure needs of ADAS and ADS, as shown by requesting information via the *Federal Register* to gain a better understanding of current and future needs, holding dialogue on the subject, providing high-level policy, and conducting research on the integration of ADAS and ADS into the surface transportation system.

In 2018, FHWA published 10 questions in the *Federal Register* (Docket No. FHWA-2017-0049) with the intent to develop a better understanding of what was needed from the infrastructure industry to support ADS. The top theme from the summarized results was "Greater Uniformity and Quality in Road Markings and Traffic Control

Devices Would Enable Automation." Within this theme, it was specifically noted that having greater consistency in pavement markings and traffic control devices and an improved state of good repair would benefit all road users, including ADS-equipped vehicles.

One of six National Dialogue meetings FHWA conducted in 2018 to facilitate information sharing, identify key issues, and support the transportation community to safely and efficiently integrate ADS-equipped vehicles into the road network focused on infrastructure design and safety. A key takeaway from that meeting was that infrastructure standards should be updated to account for ADS technology. As the testing and development of ADS increases, standards such as the MUTCD may need to be updated to reflect the needs of ADS-equipped vehicles.

In October 2018, DOT released its high-level policy document *AV3.0 — Preparing for the Future of Transportation*. The document confirms that DOT recognizes that the quality and uniformity of pavement markings, signage, and other traffic control devices support safe and efficient driving by both human drivers and ADS-equipped vehicles.

The research FHWA conducted on the impacts of ADS-equipped vehicles on highway infrastructure included literature reviews, ADS industry interviews, and national stakeholder workshops. During two workshops held in 2019[17] that presented the research findings and sought to obtain feedback and input, the highway infrastructure element that was mentioned the most and that received a high level of support was pavement markings. Most participants were aware of the value of uniform, well-maintained pavement marking practices. The key reason for their support, in the context of new technologies, is that pavement markings provide assistance to the camera/machine vision

[17] Proceedings for these workshops can be viewed at the following Web link: https://ops.fhwa.dot.gov/automationdialogue/

systems that detect and track pavement markings for ADAS features such as lane departure warning, lane-keeping assist, and lane-centering control, and some ADS technologies.

FHWA believes this final rule will result in more consistent maintenance of pavement markings, which will benefit both human and machine/camera vision, despite the fact that this rule is based on nighttime visibility needs of older drivers. However, as more definitive research on the needs of machine/camera vision becomes available, FHWA may consider additional revisions to retroreflectivity requirements along with other revisions to pavement marking standards during future updates to the MUTCD.

In consideration of the foregoing, FHWA revises the 2009 MUTCD text as follows.

Add a row to Table I-2 Target Compliance Dates Established by FHWA:

2009 MUTCD Section Number(s)	2009 MUTCD Section Title	Specific Provision	Compliance Date
3A.03	Maintaining Minimum Retroreflectivity	Implementation and continued use of a method that is designed to maintain retroreflectivity of longitudinal pavement markings (see Paragraph 1)	4 years from the effective date of this revision of the MUTCD

Add a new reference document to Section 1A.11 Relation to Other Publications:

Section 1A.11

"Methods for Maintaining Pavement Marking Retroreflectivity," (FHWA-SA-22-028), 2020 Edition (FHWA)

Revise Section 3A.03 as follows:

Section 3A.03 Maintaining Minimum Retroreflectivity

Standard:

01 Except as provided in Paragraph 5, a method designed to maintain retroreflectivity at or above 50 mcd/m^2/lx under dry conditions shall be used for longitudinal markings on roadways with speed limits of 35 mph or greater.

Guidance:

02 Except as provided in Paragraph 5, a method designed to maintain retroreflectivity at or above 100 mcd/m^2/lx under dry conditions should be used for longitudinal markings on roadways with speed limits of 70 mph or greater.

03 The method used to maintain retroreflectivity should be one or more of those described in "Methods for Maintaining Pavement Marking Retroreflectivity" (see Section 1A.11) or developed from an engineering study based on the values in Paragraphs 1 and 2.

Support:

04 Retroreflectivity levels for pavement markings are measured with an entrance angle of 88.76 degrees and an observation angle of 1.05 degrees. This geometry is also referred to as 30-meter geometry. The units of pavement marking retroreflectivity are reported in mcd/m^2/lx, which means millicandelas per square meter per lux.

Option:

05 The following markings may be excluded from the provisions established in Paragraphs 1 and 2:

A. Markings where ambient illumination assures that the markings are adequately visible;

B. Markings on streets or highways that have an ADT of less than 6,000 vehicles per day;

C. Dotted extension lines that extend a longitudinal line through an intersection, major driveway, or interchange area (see Section 3B.08);

D. Curb markings;

E. Parking space markings; and

F. Shared-use path markings.

Support:

06 The provisions of this Section do not apply to non-longitudinal pavement markings including, but not limited to, the following:

A. Transverse markings;

B. Word, symbol, and arrow markings;

C. Crosswalk markings; and

D. Chevron, diagonal, and crosshatch markings.

07 Special circumstances will periodically cause pavement marking retroreflectivity to be below the minimum levels. These circumstances include, but are not limited to, the following:

A. Isolated locations of abnormal degradation;

B. Periods preceding imminent resurfacing or reconstruction;

C. Unanticipated events such as equipment breakdowns, material shortages, and contracting problems; and

D. Loss of retroreflectivity resulting from snow maintenance operations.

When such circumstances occur, compliance with Paragraphs 1 and 2 is still considered to be achieved if a reasonable course of action is taken to resume maintenance of minimum retroreflectivity in a timely manner according to the maintaining agency's method(s), policies, and procedures.

Discussion under 1 CFR Part 51

FHWA is incorporating by reference herein Revision 3, dated May 2022.

The document that FHWA is incorporating by reference is reasonably available to interested parties, primarily State DOTs, local agencies, and Tribal governments carrying out Federal-aid highway projects. The documents incorporated by reference are available

on the docket of this rulemaking and at the sources identified in the regulation at § 655.601(d)(2). The specific standard is discussed in greater detail throughout this preamble.

Rulemaking Analyses and Notices

Rulemaking Analyses and Notices

FHWA considered all comments received before the close of business on the comment closing date. The comments are available for examination in the docket (FHWA-2009-0139) at www.regulations.gov. FHWA also considered comments received after the comment closing date to the extent practicable.

Executive Order 12866 (Regulatory Planning and Review), Executive Order 13563 (Improving Regulation and Regulatory Review), and DOT Rulemaking Policies and Procedures

Executive Orders 12866 and 13563 direct agencies to assess all costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). Executive Order 13563 emphasizes the importance of quantifying both costs and benefits, reducing costs, harmonizing rules, and promoting flexibility. This action complies with Executive Orders 12866, and 13563 to improve regulation.

The Office of Information and Regulatory Affairs has determined that this action is a significant regulatory action within the meaning of Executive Order 12866 and within the meaning of U.S. DOT regulatory policies and procedures because of significant public interest. Additionally, this action complies with the principles of Executive Order 13563. FHWA has considered the costs and potential benefits of this rulemaking and believes the rulemaking is being implemented in a manner that fulfills FHWA's obligation under Section 406 of the Department of Transportation and Related

Agencies Appropriations Act, 1993 (Pub. L. 102-388; October 6, 1992), and provides flexibility for agencies. Details on the estimated national costs are documented in the updated economic analysis report, which is available as a separate document under the docket number noted in the title of this document at http://www.regulations.gov. The flexibility is documented in the new publication titled *Methods for Maintaining Pavement Marking Retroreflectivity*, to which the MUTCD refers readers.

The MUTCD already requires that pavement "markings that must be visible at night shall be retroreflective unless ambient illumination assures that the markings are adequately visible" and that "all markings on interstate highways shall be retroreflective." This final rule includes changes to the MUTCD to provide additional guidance and clarification, while allowing flexibility in maintaining pavement marking retroreflectivity. The pavement markings excluded from the final rule are not to be excluded from any other MUTCD standards. FHWA believes that the uniform application of traffic control devices will greatly improve traffic operations efficiency and roadway safety. The standards, guidance, and support are also used to create uniformity and to enhance safety and mobility at little additional expense to public agencies or the motoring public.

Since the SNPA was published, the quality of the economic analysis has been improved. This has resulted in revised assumptions that lowered the estimated costs. The analysis provides a national estimate of the costs to implement this final rule and to replace markings. Costs for individual agencies were not computed because they would vary based on factors such as the amount of pavement marking mileage subject to the standards and current pavement marking practices. The analysis estimates national first year implementation costs of $16.17 million for all affected State and local agencies to develop maintenance methods, purchase necessary equipment, and use their method the first time. Cost impacts to manage pavement markings per this rule took into

consideration that States already have processes in place to manage pavement markings, and some States will require only minor revisions to implement the required standard. Costs associated with staff time for smaller local agencies to develop and manage the method were reduced from the SNPA analysis estimates based on scrutiny of the quantity of pavement markings affected by this rulemaking that are under the jurisdiction of these agencies. In addition, the smallest agencies affected were determined to be more likely to have a technician managing this technical program than an engineer.

In subsequent years, State and local agencies are expected to incur increased costs nationwide totaling $29.07 million annually as a result of this rule. These annual costs include $3.44 million in assessment and management activities nationwide to determine which markings require replacement in the following year. This final rule does not establish compliance dates by which agencies must replace deficient markings. However, as outlined in the economic analysis,[18] FHWA expects all State agencies and most other roadway agencies will replace markings found to be deficient, so these annual costs also include an estimated increase of approximately $25.63 million per year nationally from current estimated pavement marking replacement expenditures. These replacement costs are lower than estimated in the SNPA analysis due to a recognition that the variation in pavement marking practice and material usage by roadway classification was not adequately addressed. Additional review of available research also indicated the analysis should further stratify service life based on factors such as traffic volume.

Therefore, this final rule will not result in the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector, of $100 million or more in any single year. These changes are not anticipated to affect, in any material way, any sector of the economy adversely. In addition, these changes would not create a serious

[18] The report titled *Economic Impacts of Minimum Maintained Levels of Pavement Marking Retroreflectivity in the MUTCD* can be viewed on the docket.

inconsistency with any other Federal agency's action or materially alter the budgetary impact of any entitlements, grants, user-fees, or loan programs. FHWA has prepared an economic analysis, which has been placed in the docket.

Safety studies show that adding edge lines to two-lane highways where they were not present reduces nighttime crashes,[19,20] which is likely a result of those markings providing enough retroreflectivity to be visible to drivers at night. Therefore, FHWA believes that lives will be saved and injuries reduced by the improved maintenance of pavement marking retroreflectivity. What is not clear from the research is what safety benefit is associated with specific levels of retroreflectivity; this is where the research provides significant contradictions. A rigorous review of the safety research seems to indicate that no study has yet been completed where a significant portion of the pavement markings in the study had low enough retroreflectivity to answer conclusively the question as to a minimum recommended retroreflectivity level. Therefore, FHWA continues to base the minimum retroreflectivity levels in this final rule on research indicating the driver needs for retroreflectivity rather than on crash reduction research. As indicated in the economic analysis, reliable crash reduction factors are not available to estimate the safety benefits of maintaining pavement marking retroreflectivity at or near certain minimum levels of retroreflectivity. The analysis, therefore, calculated the number of fatalities that would need to be reduced annually to result in benefits equal to the calculated costs of this final rule. This break-even analysis indicated that the final rule will achieve benefits equal to costs if it saves three lives annually. For these reasons, FHWA finds that the expected economic benefits of the rule will outweigh the estimated costs of the rule.

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[19] Sun, X., and S. Das. *A Comprehensive Study on Pavement Edge Line Implementation.* FHWA/LA.13/508, April 2014.

[20] Tsyganov, A., R. Machemehl, and N. Warrenchuk. *Safety Impact of Edge Lines on Rural Two-Lane Highways in Texas.* FHWA/TX-05/0-5009-1, September 2005.

Regulatory Flexibility Act

In compliance with the Regulatory Flexibility Act (Pub. L. 96-354, 5 U.S.C. 601-612), FHWA has evaluated the effects of this final rule on small entities, including small governments. This final rule applies to State and local DOTs in the execution of their highway programs, specifically with respect to the retroreflectivity of pavement markings. In addition, pavement marking improvement is eligible for up to 100 percent Federal-aid funding. This also applies to local jurisdictions and Tribal governments, pursuant to 23 U.S.C. 120(c).

I hereby certify that this action will not have a significant economic impact on a substantial number of small entities.

Unfunded Mandates Reform Act of 1995

This final rule would not impose unfunded mandates as defined by the Unfunded Mandates Reform Act of 1995 (Pub. L. 104-4, 109 Stat. 48). The economic impacts analysis shows that in the first year, before annual replacement begins, State and local agencies are estimated to have nationwide costs of $16.17 million to develop maintenance methods, purchase equipment, and use their method for the first time. These are non-recurring costs. In subsequent years, these agencies are expected to incur increased costs nationwide totaling $29.07 million annually as a result of this rule. These annual costs include $3.44 million in assessment and management activities along with pavement marking replacement expenditures of approximately $25.63 million per year beyond current expenditures. There are no compliance dates to replace markings that do not meet the minimum retroreflectivity. Although agencies will still need to replace these markings, and those costs are included in this estimate, their schedules would be based on their method for maintaining retroreflectivity and their resources and relative priorities. Therefore, this action will not result in the expenditure by State, local, and Tribal governments, in the aggregate, or by the private sector, of $155 million or more in any

single year. In addition, pavement marking replacement is eligible for up to 100 percent Federal-aid funding. This applies to local jurisdictions and Tribal governments, pursuant to 23 U.S.C. 120(c). Further, the definition of "Federal Mandate" in the Unfunded Mandates Reform Act excludes financial assistance of the type in which State, local, or Tribal governments have authority to adjust their participation in the program in accordance with changes made in the program by the Federal Government. The Federal-aid highway program permits this type of flexibility.

Executive Order 13132 (Federalism Assessment)

E.O. 13132 requires agencies to ensure meaningful and timely input by State and local officials in the development of regulatory policies that may have a substantial, direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government. FHWA analyzed this action in accordance with the principles and criteria contained in E.O. 13132 and determined that this action would not have sufficient federalism implications to warrant the preparation of a federalism assessment. FHWA has also determined that this final rule would not preempt any State law or State regulation or affect the States' ability to discharge traditional State governmental functions.

The MUTCD is incorporated by reference in 23 CFR part 655, subpart F. This final rule is in keeping with the Secretary of Transportation's authority under 23 U.S.C. 109(d), 315, and 402(a) to promulgate uniform guidelines to promote the safe and efficient use of the highway.

Executive Order 13175 (Tribal Consultation)

FHWA has analyzed this action under E.O. 13175 and determined that it would not have substantial direct effects on one or more Indian Tribes, would not impose

substantial direct compliance costs on Indian Tribal governments, and would not preempt Tribal law. Therefore, a Tribal summary impact statement is not required.

Executive Order 12898 (Environmental Justice)

E.O. 12898 requires that each Federal agency make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minorities and low-income populations. FHWA has determined that this rule does not raise any environmental justice issues.

Executive Order 13211 (Energy Effects)

FHWA has analyzed this action under E.O. 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use. FHWA has determined that this action is not a significant energy action under E.O. 13211 because it is not likely to have a significant adverse effect on the supply, distribution, or use of energy. Therefore, a Statement of Energy Effects under E.O. 13211 is not required.

Paperwork Reduction Act

Under the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3501 et seq.), Federal agencies must obtain approval from the Office of Management and Budget for each collection of information they conduct, sponsor, or require through regulations. FHWA has determined that this final rule does not contain collection of information requirements for the purposes of the PRA.

National Environmental Policy Act

FHWA has analyzed this action for the purpose of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.) and has determined that it will not have any significant effect on the quality of the environment and is categorically excluded under 23 CFR 771.117(c)(20).

Regulation Identifier Number

A regulation identifier number (RIN) is assigned to each regulatory action listed in the Unified Agenda of Federal Regulations. The Regulatory Information Service Center publishes the Unified Agenda in April and October of each year. The RIN contained in the heading of this document can be used to cross-reference this action with the Unified Agenda.

List of Subjects in 23 CFR Part 655

Design Standards, Grant programs – Transportation, Highways and roads, Incorporation by reference, Pavement Markings, Traffic regulations.

Issued in Washington, D.C. under authority delegated in 49 CFR 1.85:

_____
Stephanie Pollack
Deputy Administrator
Federal Highway Administration

For the reasons stated in the preamble, FHWA amends title 23, Code of Federal Regulations, part 655, subpart F as follows:

PART 655 – TRAFFIC OPERATIONS

1. The authority for part 655 is revised to read as follows:

Authority: 23 U.S.C. 101(a), 104, 109(d), 114(a), 217, 315 and 402(a); 23 CFR 1.32; and 49 CFR 1.85.

Subpart F – Traffic Control Devices on Federal-Aid and Other Streets and Highways

2. Amend § 655.601 by revising paragraphs (d) introductory text and (d)(2)(i) to read as follows:

§ 655.601 Purpose.

* * * * *

(d) The material listed in this paragraph (a) of this section is incorporated by reference into this section with the approval of the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the FHWA must publish a document in the Federal Register and the material must be available to the public. All approved material is available for inspection at the FHWA and at the National Archives and Records Administration (NARA). Contact Federal Highway Administration, Office of Transportation Operations, 1200 New Jersey Avenue, SE., Washington, DC 20590, (202) 366-8043; https://ops.fhwa.dot.gov/contactus.htm. For information on the availability of this material at NARA, email: fr.inspection@nara.gov, or go to: www.archives.gov/federal-register/cfr/ibr-locations.html. The material may be obtained from the following source(s) in this paragraph (d).

* * * * *

(2) * * *

(i) Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD), as follows:

(A) 2009 edition, November 4, 2009.

(B) Revision No. 1, dated May 2012.

(C) Revision No. 2, dated May 2012.

(D) Revision No. 3, dated June 2022.

(ii) [Reserved]

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